This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

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1. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$4 + 8x > 11x \text{ or } 5 + 3x < 5x$$

The solution is $(-\infty, 1.333)$ or $(2.5, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-2.25, 3.75]$ and $b \in [0, 5.25]$

Corresponds to including the endpoints (when they should be excluded).

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-7.5, -2.25]$ and $b \in [-6.75, 0.75]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-0.75, 3.75]$ and $b \in [2.25, 3.75]$

* Correct option.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4.5, -1.5]$ and $b \in [-5.25, 2.25]$

Corresponds to inverting the inequality and negating the solution.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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2. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-6}{9} - \frac{7}{7}x \le \frac{-5}{2}x + \frac{8}{8}$$

The solution is $(-\infty, 1.111]$, which is option A.

A. $(-\infty, a]$, where $a \in [0.6, 1.65]$

* $(-\infty, 1.111]$, which is the correct option.

B. $(-\infty, a]$, where $a \in [-2.48, -0.67]$

$(-\infty, -1.111]$, which corresponds to negating the endpoint of the solution.

C. $[a, \infty)$, where $a \in [0, 2.25]$

$[1.111, \infty)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

D. $[a, \infty)$, where $a \in [-2.25, 0]$

$[-1.111, \infty)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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3. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No more than 2 units from the number 3.

The solution is $[1, 5]$, which is option A.

A. $[1, 5]$

This describes the values no more than 2 from 3

B. $(-\infty, 1] \cup [5, \infty)$

This describes the values no less than 2 from 3

C. $(1, 5)$

This describes the values less than 2 from 3

D. $(-\infty, 1) \cup (5, \infty)$

This describes the values more than 2 from 3

E. None of the above

You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

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4. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-5 - 6x \leq \frac{-20x - 9}{4} < 8 - 6x$$

The solution is None of the above., which is option E.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [1.5, 4.5]$ and $b \in [-12, -9]$

$(-\infty, 2.75] \cup (-10.25, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

B. $[a, b)$, where $a \in [1.5, 3.75]$ and $b \in [-12, -9]$

$[2.75, -10.25)$, which is the correct interval but negatives of the actual endpoints.

C. $(-\infty, a) \cup [b, \infty)$, where $a \in [1.5, 6]$ and $b \in [-11.25, -6]$

$(-\infty, 2.75) \cup [-10.25, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

D. $(a, b]$, where $a \in [2.25, 7.5]$ and $b \in [-12.75, -6.75]$

$(2.75, -10.25]$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $[-2.75, 10.25)$.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-8 + 4x > 6x \text{ or } -3 + 3x < 4x$$

The solution is $(-\infty, -4.0)$ or $(-3.0, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [2.25, 7.5]$ and $b \in [3.75, 4.5]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-6, -1.5]$ and $b \in [-3.75, -2.25]$

Corresponds to including the endpoints (when they should be excluded).

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-10.5, -3]$ and $b \in [-6, -2.25]$

* Correct option.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-1.5, 3.75]$ and $b \in [1.5, 6]$

Corresponds to inverting the inequality and negating the solution.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-10x - 6 \leq -9x + 5$$

The solution is $[-11.0, \infty)$, which is option B.

A. $(-\infty, a]$, where $a \in [-13, -8]$

$(-\infty, -11.0]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

B. $[a, \infty)$, where $a \in [-11, -4]$

* $[-11.0, \infty)$, which is the correct option.

C. $[a, \infty)$, where $a \in [10, 14]$

$[11.0, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [9, 12]$

$(-\infty, 11.0]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-6x - 4 \leq 3x + 10$$

The solution is $[-1.556, \infty)$, which is option C.

A. $[a, \infty)$, where $a \in [0.56, 6.56]$

   $[1.556, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a]$, where $a \in [-4.56, 0.44]$

   $(-\infty, -1.556]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $[a, \infty)$, where $a \in [-1.56, -0.56]$

   * $[-1.556, \infty)$, which is the correct option.

D. $(-\infty, a]$, where $a \in [-0.44, 8.56]$

   $(-\infty, 1.556]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

   You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 - 9x \leq \frac{-15x + 9}{3} < 7 - 6x$$

The solution is None of the above., which is option E.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [2.25, 6]$ and $b \in [-6, -2.25]$

   $(-\infty, 2.50] \cup (-4.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

B. $[a, b)$, where $a \in [-1.5, 8.25]$ and $b \in [-4.5, -1.5]$

   $[2.50, -4.00)$, which is the correct interval but negatives of the actual endpoints.

C. $(a, b]$, where $a \in [0.75, 5.25]$ and $b \in [-7.5, -2.25]$

   $(2.50, -4.00]$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-2.25, 3]$ and $b \in [-5.25, -3]$

   $(-\infty, 2.50) \cup [-4.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

E. None of the above.

   * This is correct as the answer should be $[-2.50, 4.00)$.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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9. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

$$\text{Less than 4 units from the number } -10.$$

The solution is $(-14, -6)$, which is option D.

A. $(-\infty, -14] \cup [-6, \infty)$

   This describes the values no less than 4 from -10

B. $(-\infty, -14) \cup (-6, \infty)$

   This describes the values more than 4 from -10

C. $[-14, -6]$

   This describes the values no more than 4 from -10

D. $(-14, -6)$

   This describes the values less than 4 from -10

E. None of the above

   You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

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10. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-9}{2} - \frac{5}{8}x \geq \frac{6}{4}x + \frac{10}{6}$$

The solution is $(-\infty, -2.902]$, which is option A.

A. $(-\infty, a]$, where $a \in [-6.75, -2.25]$

   * $(-\infty, -2.902]$, which is the correct option.

B. $(-\infty, a]$, where $a \in [2.25, 6.75]$

   $(-\infty, 2.902]$, which corresponds to negating the endpoint of the solution.

C. $[a, \infty)$, where $a \in [-6, -0.75]$

   $[-2.902, \infty)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

D. $[a, \infty)$, where $a \in [-0.75, 6.75]$

   $[2.902, \infty)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

   You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.